

REMARKS

A Supplemental Information Disclosure Statement (IDS) is filed together with the present Amendment "D" and Response.

Some of the rejected claims have been amended. No new matter has been added.

Applicant submits this Amendment "D" for the Examiner's consideration. Reexamination and reconsideration of the application, as amended, in view of the following remarks are respectfully requested.

1. STATUS OF THE CLAIMS

Claims 1, 2, 4, 6-15, and 39-48 were presented for examination, and they stand rejected and pending in the application. Claims 1, 2, 4, 6-15, and 39-48 stand rejected under 35 U.S.C. § 103(a). Some of the rejected claims have been amended.

2. RESPONSE TO REJECTIONS

2.1. First Set of Claim Rejections Under 35 U.S.C. § 103(a)

The following claims:

Independent claim 1, and dependent claims 2, 4, 6-9;

Independent claim 10, and dependent claims 11-12, 39-41;

Independent claim 13, and dependent claim 42;

Independent claim 14, and dependent claim 43;

Independent claim 15, and dependent claim 44; and

Independent claim 45, and dependent claims 46-48;

stand rejected under 35 U.S.C. § 103(a) as obvious over Lim, *et al.*, U.S. Pat. No. 5,530,376 (hereinafter "Lim"). See Office Action, p. 3, item 3.

Lim discloses a reusable carrier for burn-in/testing of non-packaged die with a cavity or well for receiving the die. The carrier disclosed by Lim has a well that is configured for receiving and holding therein a die for burn-in/testing. The die in Lim is thus imbedded into the carrier because Lim relies on the insertion of the die into a well, such as well 15. The carrier disclosed by Lim is not configured for receiving thereon, namely on its outermost surface, a die. This outermost surface in Lim does not perform any function in holding the die, which is entirely below such outermost surface by at least a portion of the height of wall 20 of die well 15. See, e.g., Lim, Figs. 1, 1B, 2-4, 5A, 6A, 7C, 8D, 9, 10-13, 13A, 14-16; col. 2, *ll.* 54-56, 62-66; col. 4, *ll.* 6-8, 13-15; col. 5, *ll.* 22-25, 50-51, 55, 65-66; col. 6, *ll.* 13-15, 29-30, 39-43, 56; col. 7, *l.* 66; col. 8, *ll.* 1, 21, 58-59; col. 9, *ll.* 5-6. In contrast, all the independent claims, and thus by incorporation all the dependent claims too, presently recite an interposer with a substrate that has an outermost surface for receiving above it a semiconductive device such that the semiconductive device lies at least in part on said outermost

surface and is unimbedded into said substrate. Lim does not describe, teach or suggest this structural element.

Applicant respectfully submits that terms such as imbedding, unimbedded, and related terms are not indefinite. Imbedding is herein used to indicate insertion into a recess or cavity so that the imbedded element is within such cavity or recess, for example, as die 6 is in well 15 in Lim. The prefix un- is employed in its standard usage meaning the absence of the quality or state to which the prefix is applied. For example, by way of illustration and not as an interpretive limitation by reference to the present Application, semiconductive device 16 shown in Fig. 8 is unimbedded into substrate 18.

Lim requires the use of a pressure distribution plate for holding and maintaining in place the die inside the cavity or well. Furthermore, the pressure distribution plate necessitates other cooperative structural elements for holding the die inside the cavity and dissipating heat. These structural features are distinguishable from those recited in the present claims, and also imply that the teachings in Lim would have to be significantly modified to arrive at the claimed interposer.

The carrier and die disclosed in Lim are configured with respect to each other so that none of the die terminals are located in the region between the die and the outermost surface of the carrier. All the die terminals according to Lim are located below such outermost surface and within the well or cavity were the die is imbedded. In contrast, the present claims recite that at least some of the semiconductive device terminals are located in the region between the semiconductive device and the outermost surface of the interposer substrate. Lim does not teach or disclose this configuration of structural elements.

Lim does not teach or suggest how to solve the problems solved by the presently claimed invention in light of the differences in structural elements and configurations between the disclosure in Lim and the presently recited systems.

Applicant respectfully traverses the assertion that it "would have been obvious for one of ordinary skill in the art to consider that the carrier in Lim et al is inserted into a test equipment and this test equipment would support and electrically coupl[e] to that carrier". Office Action, p. 3, item 3. Given the structural differences between the embodiments disclosed in Lim and those recited in the present claims, the embodiments disclosed in Lim would have to be significantly modified to arrive at the presently recited features so that the interposer could be handled as the presently recited interposer. There is not suggestion or indication that such modifications could be performed in light of the ordinary skill in the art absent the teachings provided by the present Application.

First, the surface at the bottom of the well may not be regarded as an outermost surface when the well is a required element in Lim. If the surface on which the metallized grooves 16 and the probe heads 17 in Lim becomes an outermost surface, then the well or cavity 15 disappears, and the carrier disclosed in Lim becomes inoperative for the intended purpose disclosed in Lim.

Second, Lim relies on the imbedding of a die into a well or cavity down the wall of such well or cavity. The die and its bond pads are within such well, between an innermost surface (the bottom of the well) and the outermost surface which is in contact with the pressure distribution plate 13 in Lim. Electrical contacts between die bond pads and probe heads, heat dissipation, and holding of the die in Lim are all to be performed with the die held in place in the well by a plurality of cooperative elements. Because of at least these two reasons, the innermost and outermost surfaces in Lim are actual structural features that are associated with requirements in the disclosure in Lim, and with the specific way Lim addresses problems related to its carrier and die configuration.

Because of differences and limitations such as those described hereinabove, Lim has not suggested the claimed interposer, and it may not be asserted that the teachings in Lim are sufficient for one of ordinary skill in the art to make the substitutions, combinations or other modifications that are necessary to arrive to the interposer claimed in the rejected claims. Limitations and differences such as those set forth hereinabove also demonstrate that Lim does not teach or suggest all the claim limitations in the rejected claims. However, this teaching is required for establishing a *prima facie* case of obviousness. See M.P.E.P. § 2142, p. 2100-97 (Rev. 1, Feb. 2000) (citing *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991), providing three requirements for establishing a *prima facie* case of obviousness including the requirement that “the prior art reference ... must teach or suggest all the claim limitations”). In light of at least these differences and limitations, Lim does not provide the suggestion and the expectation of success that must be founded in the prior art rather than in applicant's disclosure. See *In re Dow Chemical Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988). See also M.P.E.P. §§ 2142-43, p. 2100-97 (Rev. 1, Feb. 2000) (providing the basic requirements of a *prima facie* case of obviousness). Furthermore, no art of record provides any suggestion or motivation for modifying the teachings in Lim to arrive at the claimed systems. See M.P.E.P. §§ 2142-43, p. 2100-97 (Rev. 1, Feb. 2000) (providing the basic requirements of a *prima facie* case of obviousness).

Consequently, Applicant respectfully submits that Lim does not support a *prima facie* case of obviousness regarding the present claims. Applicant respectfully requests the reconsideration and withdrawal of this rejection.

2.2. Second Set of Claim Rejections Under 35 U.S.C. § 103(a)

Independent claim 45, and dependent claims 46-48 stand rejected under 35 U.S.C. § 103(a) as obvious over Lockwood, *et al.*, U.S. Pat. No. 4,697,143 (hereinafter "Lockwood"). See Office Action, p. 2, item 2. Independent claim 45, and by incorporation its dependent claims, have been amended to recite features that patentably distinguish the interposer claimed in claims 45-48 from the teachings in Lockwood. To this respect, Applicant incorporates herein the characterization of the teachings in Lockwood and the discussion provided in relevant part of Amendment "C" and Response regarding the introduced amendments which were also introduced in Amendment "C" and Response in light of the teachings provided by the same reference.

Consequently, Applicant respectfully submits that Lockwood does not support a *prima facie* case of obviousness regarding the present claims 45-48. Applicant respectfully requests the reconsideration and withdrawal of this rejection.

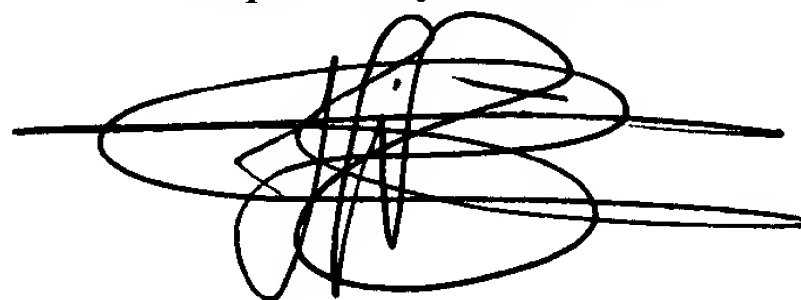
3. CONCLUSIONS

In view of the above, Applicant respectfully maintains that the present application is in condition for allowance. Reconsideration of the rejections is requested. Allowance of the pending claims at an early date is solicited.

In the event that the Examiner finds any remaining impediment to a prompt allowance of this application which could be clarified by a telephonic interview, or which is susceptible to being overcome by means of an Examiner's Amendment, the Examiner is respectfully requested to initiate the same with the undersigned attorney.

Dated this 15th day of October 2001.

Respectfully submitted,



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Marked up Version of the Pending Claims Under 37 C.F.R. § 1.121(c)(1)(ii):

Applicant submits the following marked up version only for claims being changed by the current amendment, wherein the markings, if any, are shown by brackets (for deleted matter) and/or underlining (for added matter)

1. (Thrice Amended) An interposer for electrically coupling a semiconductive device to an electrical apparatus, the interposer comprising:

an electrically insulative substrate for coupling to an electric apparatus, said substrate having a portion that has a uniform thickness, and said portion having a planar surface, said planar surface being part of a substrate outermost surface for receiving thereover a semiconductive device such that said semiconductive device lies at least in part over said outermost surface and is unimbedded into said substrate; and

an electrical conductor on the planar surface of the portion of the electrically insulative substrate, the electrical conductor having a receiving end on the planar surface of the portion of the electrically insulative substrate for connecting to a semiconductive device at electrically conductive terminals of said semiconductive device and such that at least some of said terminals are located in the region between said semiconductive device and said outermost surface of said substrate, and a terminal end on the planar surface of the portion of the electrically insulative substrate for connecting to an electrical apparatus, such that the coupling of said substrate to said electric apparatus structurally supports said substrate with said terminal end in electric contact with said electric apparatus.

10. (Thrice Amended) An interposer for electrically coupling a semiconductive device to an electrical apparatus, the interposer comprising:

a sheet for coupling to an electrical apparatus, said sheet having a portion that has a uniform thickness, and said sheet comprised of an electrically insulating[,] material, said sheet having an outermost surface for receiving thereon a semiconductive device such that said semiconductive device lies at least in part on said outermost surface and is unimbedded into said substrate; and

an electrical conductor on the portion, the electrical conductor having a receiving end on said portion for connecting to a semiconductive device at electrically conductive terminals of said semiconductive device such that at least some of said terminals are located in the region between said semiconductive device and said outermost surface of said sheet, and a terminal end on said portion for connecting to an electrical apparatus, such that the semiconductive device is electrically coupled to the electrical apparatus when the semiconductive device is connected to the receiving end of the electrical conductor and the terminal end of the electrical conductor is connected to the electrical apparatus, such that the coupling of said sheet to said electric apparatus structurally supports said sheet with said terminal end in electric contact with said electric apparatus.

13. (Thrice Amended) An interposer for electrically coupling a semiconductive device to an electrical apparatus, the interposer comprising:

an electrically insulative sheet for coupling to an electrical apparatus, said sheet having a portion that has a uniform thickness, and said portion being composed of a material selected from the group consisting of devitrified ceramics, vitro ceramics, single oxide ceramics, and mixed oxide ceramics, and mixtures thereof, said sheet having an outermost surface for receiving thereon a semiconductive device such that said semiconductive device lies at least in part on said outermost surface and is unimbedded into said substrate; and

an electrical conductor on said portion, the electrical conductor having a receiving end on said portion for connecting to a semiconductive device at electrically conductive terminals of said semiconductive device such that at least some of said terminals are located in the region between said semiconductive device and said outermost surface of said sheet, and a terminal end on said portion for connecting to an electrical apparatus, such that the semiconductive device is electrically coupled to the electrical apparatus when the semiconductive device is connected to the receiving end of the electrical conductor and the terminal end of the electrical conductor is connected to the electrical apparatus, such that the coupling of said sheet to said electric apparatus structurally supports said sheet with said terminal end in electric contact with said electric apparatus.

14. (Thrice Amended) An interposer for electrically coupling a semiconductive device to an electrical apparatus, the interposer comprising:

an electrically insulative sheet for coupling to an electrical apparatus, said sheet having a portion that has a uniform thickness, and said portion being composed of an electrically insulating material selected from the group consisting of alumina, alumina with silica, alumina with silicates, alumina with derivatives of silicates, and mixtures thereof, said sheet having an outermost surface for receiving thereon a semiconductive device such that said semiconductive device lies at least in part on said outermost surface and is unimbedded into said substrate; and

an electrical conductor on said portion, the electrical conductor having a receiving end on said portion for connecting to a semiconductive device at electrically conductive terminals of said semiconductive device such that at least some of said terminals are located in the region between said semiconductive device and said outermost surface of said sheet, and a terminal end on said portion for connecting to an electrical apparatus, such that the semiconductive device is electrically coupled to the electrical apparatus when the semiconductive device is connected to the receiving end of the electrical conductor and the terminal end of the electrical conductor is connected to the electrical apparatus, such that the coupling of said sheet to said electric apparatus structurally supports said sheet with said terminal end in electric contact with said electric apparatus.

15. (Thrice Amended) An interposer for electrically coupling a semiconductive device to an electrical apparatus, the interposer comprising:

an electrically insulative sheet for coupling to an electrical apparatus, said sheet having a portion that has a uniform thickness, and said portion being composed of an electrically insulating material selected from the group consisting of boron nitrides, aluminum nitrides, and mixtures thereof, said sheet having an outermost surface for receiving thereon a semiconductive device such that said semiconductive device lies at least in part on said outermost surface and is unimbedded into said substrate; and

an electrical conductor on said portion, the electrical conductor having a receiving end on said portion for connecting to a semiconductive device at electrically conductive terminals of said semiconductive device such that at least some of said terminals are located in the region between said semiconductive device and said outermost surface of said sheet, and a terminal end on said portion for connecting to an electrical apparatus, such that the semiconductive device is electrically coupled to the electrical apparatus when the semiconductive device is connected to the receiving end of the electrical conductor and the terminal end of the electrical conductor is connected to the electrical apparatus, such that the coupling of said sheet to said electric apparatus structurally supports said sheet with said terminal end in electric contact with said electric apparatus.

45. (Once Amended) An interposer for electrically coupling a semiconductive device to an electrical apparatus, the interposer comprising:

an electrically insulative substrate for coupling to an electric apparatus, said substrate being comprised of a material selected from the group consisting of crystalline glass, nitride, and carbide, and mixtures thereof, said substrate having an outermost surface for receiving thereon a semiconductive device such that said semiconductive device lies at least in part on said outermost surface and is unimbedded into said substrate; and

an electrical conductor on the substrate, the electrical conductor having a receiving end for connecting to a semiconductive device at electrically conductive terminals of said semiconductive device such that at least some of said terminals are located in the region between said semiconductive device and said outermost surface of said substrate, and a terminal end for connecting to an electrical apparatus, such that the coupling of said substrate to said electrical apparatus structurally supports said substrate with said terminal and in electrical contact with said electrical apparatus.